

## **ABSTRACT OF THE DISCLOSURE**

Methods to manufacture nanoscale particles comprising metals, alloys, intermetallics, ceramics are disclosed. The thermal energy is provided by plasma, internal energy, heat of reaction, microwave, electromagnetic, direct electric arc, pulsed electric arc and/or nuclear. The process is operated at some stage above 3000K and at high velocities. The invention can be utilized to prepare nanopowders for nanostructured products and devices such as ion conducting solid electrolytes for a wide range of applications, including sensors, oxygen pumps, fuel cells, batteries, electrosynthesis reactors and catalytic membranes.